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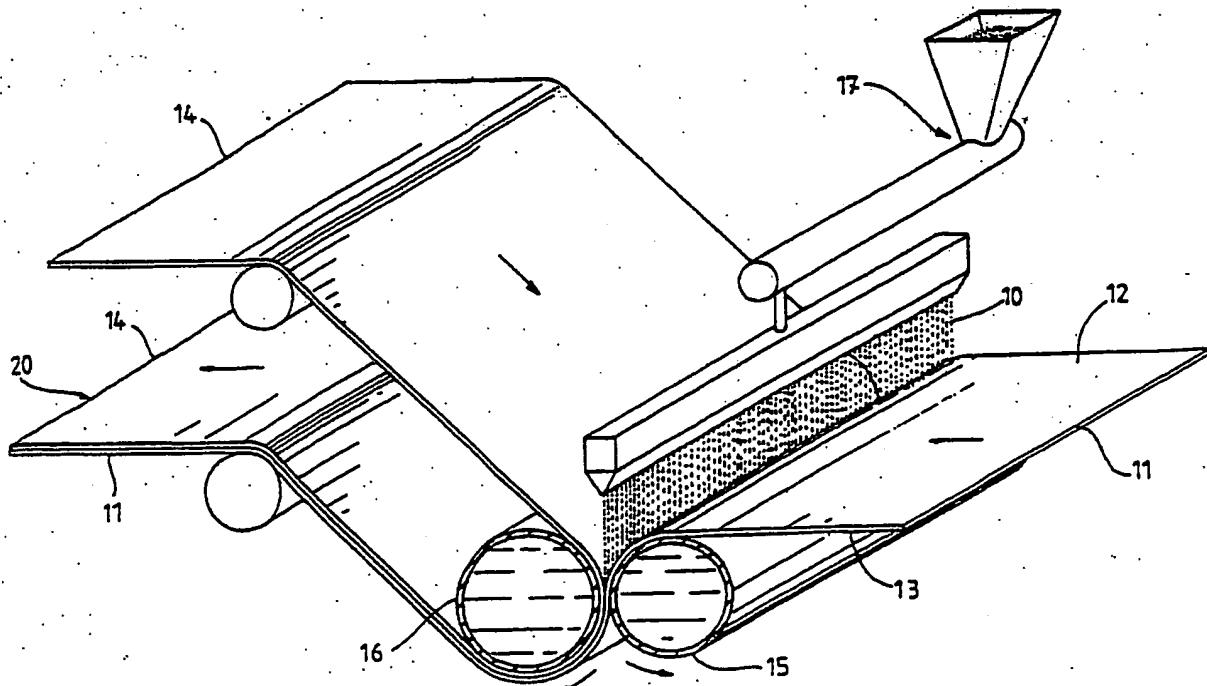
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(71) Applicant (for all designated States except US): BERCPA S.A. [LU/LU]; Boulevard Prince-Henri II, L-2014 Luxembourg (LU).		
(72) Inventor: and		
(75) Inventor/Applicant (for US only): SCHMITZ, Claude [LU/LU]; Boulevard Prince-Henri II, L-2014 Luxembourg (LU).		
(74) Agents: VANDERPERRE, Robert et al.; Bureau Vander Haeghen, Rue Colonel Bourg 108A, B-1040 Brussels (BE).		

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(54) Title: METHOD FOR MANUFACTURING CARPETS



(57) Abstract

For the purpose of manufacturing carpets comprising a top layer at the top and at least one backing layer at the back thereof, the top layer (14) on the one side and the backing layer (14) on the other side are simultaneously pressed together with an extruded plastic (10) layer flowing down therebetween, said plastic flowing down being solidified together in such a way that the top layer is fixed thereby to said backing layer.

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## METHOD FOR MANUFACTURING CARPETS

The invention relates to the manufacture of carpets consisting mainly of plastic.

Plastic has indeed been used previously for manufacturing carpets. The manufacture of tufted carpets, for example, is carried out by needling a polypropylene yarn into a base fabric each time along the back thereof, so that small loops are formed on the other side of the base fabric. Then the small loops are either cut or retained as loops. On the back of the base fabric a latex layer is then applied which secures the yarn along the back of the fabric and prevents it from coming loose. To said latex layer a backing layer is then applied which consists of latex foam or jute-like fabric depending on the intended use of the carpet.

Woven carpet is manufactured by pulling a polypropylene yarn through between warp threads and weft threads. In known woven carpets, the warp thread consists of cotton and the weft thread normally of jute. A backing layer is applied on the back.

In the case of needlefelt carpets, a needlefelt is made of plastic and on the back a backing layer is then applied which normally consists of latex foam.

A drawback of such known carpets is that the manufacture thereof requires a so-called two-way system, in which the base fabric and the backing layer are moved separately.

Even in known carpets, at least two different base materials are used. This has the drawback that such carpets cannot be recycled completely, because in this case an impure plastic is obtained, which results in environmental pollution.

However, there are thermoformed carpets which largely consist of polyethylene. Such carpets are used in the car industry. The products added when manufacturing such carpets have the inevitable result, however, that recycling produces an impure plastic which is not readily reusable.

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One object of the present invention is to present a novel carpet development, in particular a novel method for manufacturing plastic carpets.

In order to achieve the abovementioned object, 5 the present invention provides a method for manufacturing a carpet comprising a top layer (pile, fabric or needle-felt) at the top and a backing layer at the back thereof, the top layer on the one side and said backing layer on the other side being simultaneously pressed together with 10 an extruded plastic flowing down therebetween, said plastic flowing down being solidified together in such a way that the top layer is fixed thereby to said backing layer.

For example, the pressing together of said layers 15 is effected by making them converge between two cooled rollers positioned parallel and next to one another. The spacing between the rollers is controlled in accordance with the total thickness of the carpet.

This method has the advantage that it provides 20 for an economical manufacturing process which, moreover, is genuinely environmentally compatible, because the production process does not give rise to waste waters or the generation of smoke. As a result a carpet is obtained, comprising a top layer and a backing layer at the back thereof, the top layer being fixed to the backing 25 layer by a solidified plastic layer.

The method according to the invention is suitable 30 for manufacturing, primarily, tufted carpets, woven carpets and needlefelt carpets. It should be emphasised that, as a further advantage of said carpets made in the abovementioned manner, these are completely waterproof.

In particular, it is also an object of the invention to present plastic carpets which can be 35 recycled completely. This object is achieved by using one and the same base material for the yarn, the backing layer, the possible base fabric and for the plastic flowing down. When recycling the carpet, a virtually 100% pure granular material is then obtained which, for example, can be reused for manufacturing the backing

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layer of new carpets, which has both economical advantages and advantages with regard to reduced environmental pollution. However, the granular material obtained may, for example, also be employed in the plastics industry 5 for applications in injection and extrusion.

The invention will now be explained in more detail with reference to the accompanying drawings.

In Figure 1, reference number 11 indicates a top layer which may form the top side of a carpet, whether a tufted fabric, a woven fabric or a needlefelt. Back 10 12 of the layer 11 is turned upwards, and the top 13 thereof is turned downwards. The layer 11 consists of any plastic or natural product or a mixture of a plurality of these.

Said layer 11 is moved as a whole between two rollers 15 and 16, respectively, which are positioned parallel and next to one another. Said rollers are water cooled and the spacing between them can be regulated. There is likewise arranged between the rollers a backing 20 layer 14, either felt or web or fabric, or some other which consists of any plastic or natural product.

Between the top layer 11 and the backing layer 14, a molten plastic 10 is made to flow down by means of an extruder 17. The extruder 17 is fed with a plastic 25 granules or plastic powder. Thus the layers 11, 14 and the molten plastic 10 are pressed together, the backing layer 14 being directly bonded to the pile yarn and said pile yarn being fixed perfectly. The spacing between the rollers is regulated in order to exert a pressure on the running layers therebetween in accordance with the total 30 thickness of the carpet. Cooling of the rollers is adjusted to the speed of the layers therebetween. Thus a robust, finished carpet 20 is obtained in one step.

It should be noted that the manufacturing process 35 is considerably simplified with respect to the conventional coating procedures and is thus economical. Moreover, the process according to the invention is genuinely environmentally compatible, as it does not give rise to wastewater or the generation of smoke.

Preferably, only those plastics are employed which can be recycled in the form of granules.

To summarise, the invention relates to the coating or laminating together of any top layer, either 5 i.e. or woven fabric or needlefelt, with a backing layer, felt or web or fabric or another, made of any plastic or natural product, by means of any extruded plastic.

For the top layer, one or more of the following 10 base materials can be used, for example: inter alia polypropylene, polyethylene, polyester, polyamide, polyacrylic, wool.

Regarding the backing layer, one or more of the following base materials can be used, for example: inter 15 alia polypropylene, polyethylene, polyester, polyamide, polyacrylic, jute, cotton.

As far as the extruded plastic is concerned, one or more among the following plastics may be used: inter 20 alia, polypropylene, polyethylene, polyester, polyamide, polyacrylic. All the plastics can also be used with the addition of CaCO<sub>3</sub>.

By means of the invention, a carpet is obtained which comprises a top layer at the top and a backing 25 layer at the back thereof, the top layer being fixed to the backing layer by a solidified plastic interlayer.

Figure 2, for example, represents a tufted carpet in which the top layer comprises a base cloth 11a and a pile yarn 11b needled thereinto. The top layer, i.e. the 30 pile yarn together with the base cloth, is fixed to the backing layer 14 by the solidified plastic interlayer 10.

In the case of tufted or needlefelt carpets, in which said backing layer consists of a plastic felt, the method can be used in such a way that a second extruded plastic is made to flow down at the rear side of the 35 plastic felt in such a way that a plastic fabric can be bonded thereto. Figure 3 shows a carpet comprising a second solidified plastic interlayer 18 with a plastic fabric 19 thereon.

It is furthermore possible, by employing one and

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the same base material for the top layer, the backing layer and the extruded plastic, to manufacture plastic carpets which can be recycled completely, a virtually 100% pure granular material being obtained in the process. Moreover, it is possible to use, for the interlayer to be extruded, a recycled granular material or powder, resulting in a reduction in cost of manufacturing.

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## CLAIMS

1. Method for manufacturing a carpet comprising a top layer (11) at the top and at least one backing layer (14) at the back thereof, characterized in that the top layer (11) on the one side and said backing layer (14) on the other side are simultaneously pressed together with an extruded plastic (10) flowing down therebetween, said plastic flowing down being solidified together in such a way that the top layer is fixed thereby to said backing layer.
2. Method according to Claim 1, characterized in that the plastic flowing down is an extruded plastic granular material or plastic powder.
3. Method according to Claim 1 or 2, characterized in that the pressing together of said layers is effected by making them converge between two cooled rollers positioned parallel and next to one another, the spacing between the rollers being controlled in accordance with the total thickness of said layers.
4. Method according to Claim 3, characterized in that the cooling of the rollers is adjusted to the speed of the layers therebetween.
5. Method according to any one of Claims 1 to 4 inclusive, characterized in that there is used for the top layer a plastic, a natural product or a mixture of a plurality thereof.
6. Method according to any one of Claims 1 to 5 inclusive, characterized in that there is used for the backing layer a plastic, a natural fabric or a mixture of plastic and natural product.
7. Method according to any one of Claims 1 to 6 inclusive, characterized in that there is used for the top layer, the backing layer and the plastic flowing down, at least one plastic which can be recycled completely, a granular material or a powder being obtained in the process.
8. Method according to Claim 7, characterized in that there is used for the top layer, the backing layer and the plastic flowing down, one and the same plastic

which can be recycled completely, a granular material or powder of virtually 100% purity being obtained in the process.

9. Carpet comprising a top layer at the top and a backing layer at the bottom thereof, which has been manufactured according to the method defined in any one of the preceding claims.

10. Carpet according to Claim 9, characterized in that said top layer is fixed to the backing layer by a solidified plastic interlayer.

11. Carpet according to Claim 10, characterized in that said layers consist of at least one plastic which can be recycled completely, a granular material or powder being obtained in the process.

12. Carpet according to Claim 10 or 11, characterized in that the top layer consists of at least one plastic, a natural product or a mixture of a plurality of these.

13. Carpet according to any one of Claims 10 to 12 inclusive, characterized in that the backing layer consists of an action back plastic layer.

14. Carpet according to any one of Claims 10 to 12 inclusive, characterized in that the backing layer consists of a plastic felt.

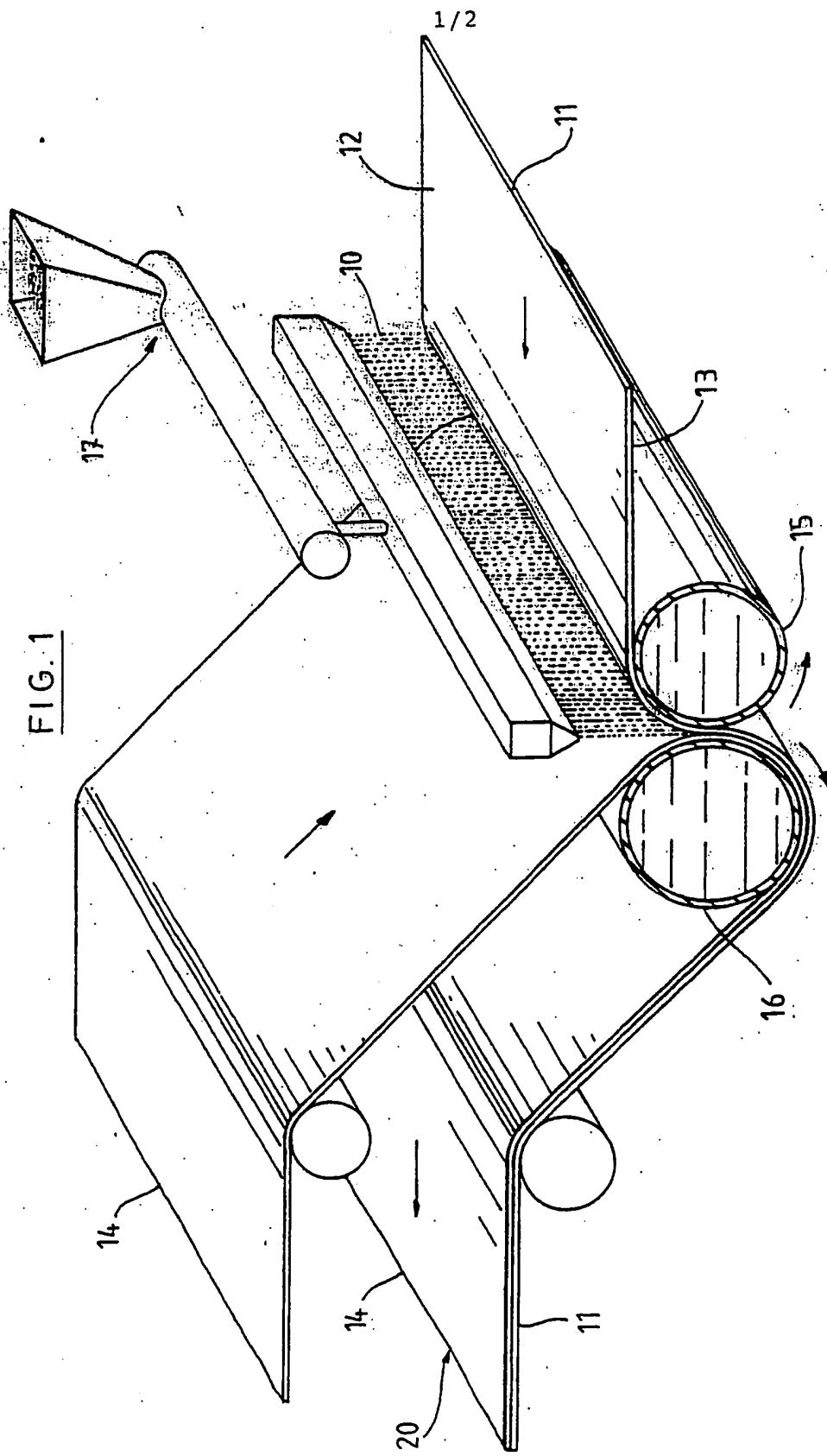
15. Carpet according to Claim 14, characterized in that a plastic fabric is bonded to the plastic felt by a plastic layer.

16. Carpet according to any one of Claims 12 to 15 inclusive, characterized in that the backing layer consists of a fabric made of a natural product.

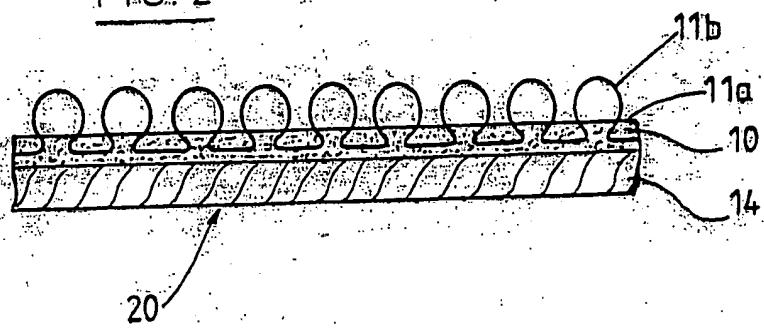
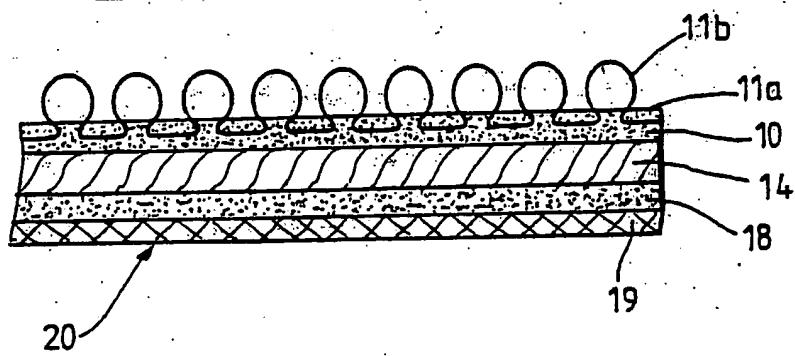
17. Carpet according to any one of Claims 12 to 16 inclusive, characterized in that the top layer consists of a tufted fabric.

18. Carpet according to any one of Claims 12 to 16 inclusive, characterized in that the top layer consists of a woven fabric.

19. Carpet according to any one of Claims 12 to 16 inclusive, characterized in that the top layer consists of a needlefelt.



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FIG. 2FIG. 3

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 5 D06N7/00 B32B27/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 5 D06N B32B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB,A,971 958 (THE DOW CHEMICAL COMPANY) 7 October 1964  see page 2, line 88 - line 99; claims 1,6-8; figure 3 see page 3, line 93 - page 4, line 59 see page 4, line 116 - page 5, line 16	1,3-6,9, 10,12, 17,18
X	GB,A,1 526 800 (JAPAN SYNTHETIC RUBBER COMPANY LIMITED) 27 September 1978  see page 17, line 16 - line 40; figures	1-6,9, 10,12, 16,18

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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## INTERNATIONAL SEARCH REPORT

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CHEMIEFASERN/TEXTILINDUSTRIE MAN-MADE FIBER vol. 41, no. 10, October 1991, FRANKFURT/MAIN, DE pages 1235 - 1236 A. ADDODO ET AL. 'MEHRSCHECHTIGER PP-BELAG FÜR AUTOBÖDEN' see page 1235, right column, paragraph 3 - page 1236, last paragraph; figures 5,6	1,5-15, 17,19 3
X	EP,A,0 518 014 (HÜLS AKTIENGESELLSCHAFT) 16 December 1992 see column 3, line 51 - column 4, line 30; claims; example	1,2,5-7, 9-13,17 3,8,16
P,X	WO,A,93 15909 (TENNESSEE VALLEY PERFORMANCE PRODUCTS, INC.) 19 August 1993 see page 15, line 21 - page 16, line 26; claims; figures	1,5,6,9, 10,12, 13,17,18
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P,X	DE,U,92 12 210 (GEBING, THOMAS) 11 February 1993 see page 11, line 23 - page 12, paragraph 2; claims; figure 1	1,2,5-7, 9-12 14,15
A	WO,A,91 01221 (SANBORN) 7 February 1991 see claims 17-19; figures 3-5	1,2,5,6, 9,10, 12-15,18
A	DE,A,27 27 285 (FORD-WERKE AG) 12 January 1978 see claims; figure	1-5
P,A	WO,A,93 12285 (TARKETT PEGULAN AG) 24 June 1993 see page 3, paragraph 4 - page 5, paragraph 2; claims; examples	9-19

## INTERNATIONAL SEARCH REPORT

Information on patent family members

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